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ABSTRACT

In recent years, increases in public school enrollment and possibility that teacher shortages exist or will exist in specific geographic regions and subject areas have raised questions about the supply of and demand for public school teachers. Information submitted by Local Education Agencies (LEAs) in Pennsylvania and certification records were examined to determine the supply of and the demand for teachers by Pennsylvania public schools and to determine if the state is experiencing a teacher shortage. Analysis of this data yielded the following results and conclusions: (1) in general, a more than adequate supply of certified teachers exists to meet the demand for classroom teachers; (2) although there was a demand for elementary teachers to fill new positions generated by increasing enrollments and teachers leaving their positions, there was little or no demand for secondary teachers to fill new positions; (3) because only minor differences existed in the demand for teachers by certification area, it appears that special incentive programs to influence prospective teachers to enter special areas are unnecessary; (4) hiring patterns related to newly certified teachers suggest that there was a significant surplus of available teachers; and (5) overall study results appear to indicate that there is no unmet demand for classroom teachers based on data for 1989-1990 and 1990-1991. (IAH)

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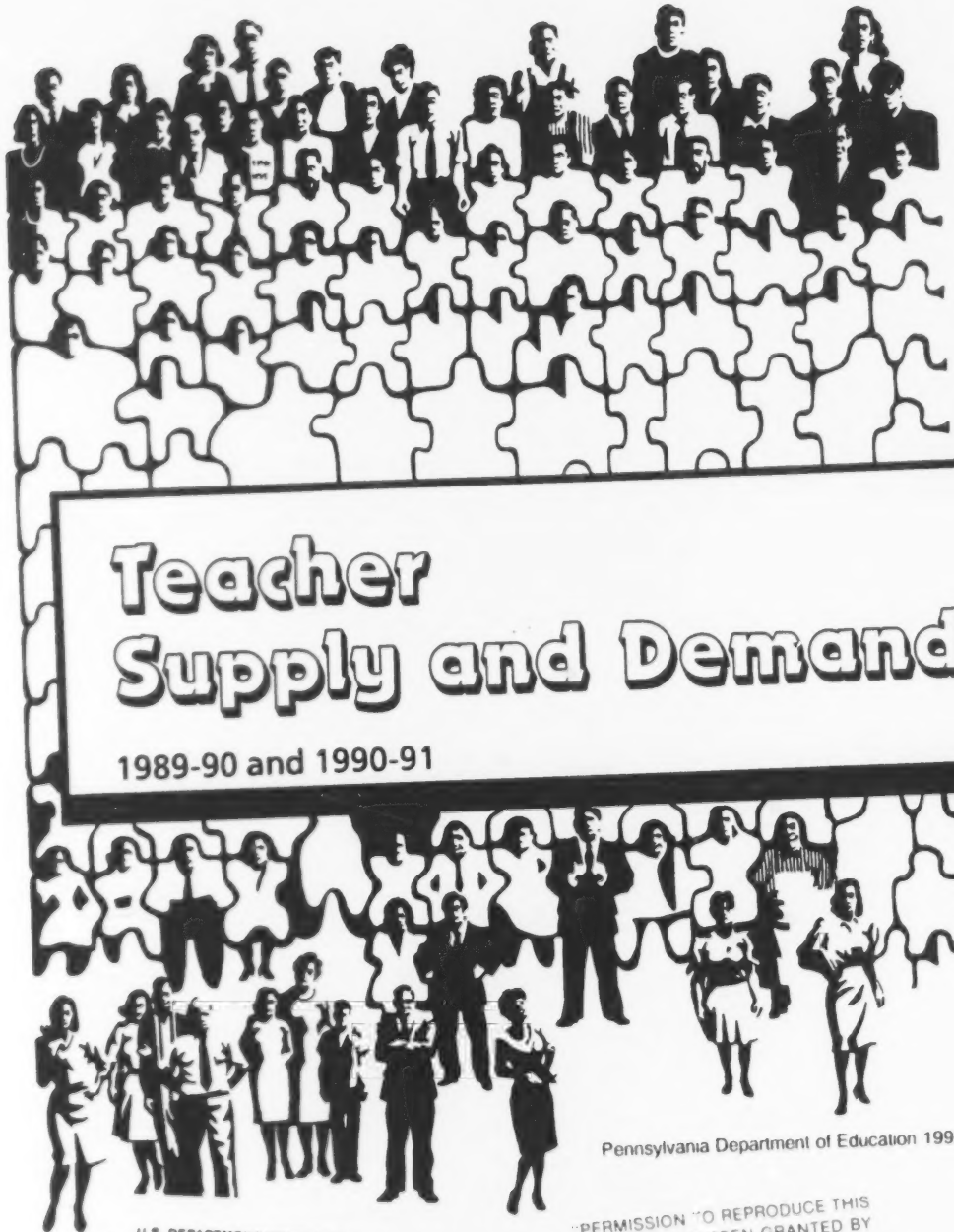

Teacher Supply and Demand

1989-90 and 1990-91

Pennsylvania Department of Education 1992

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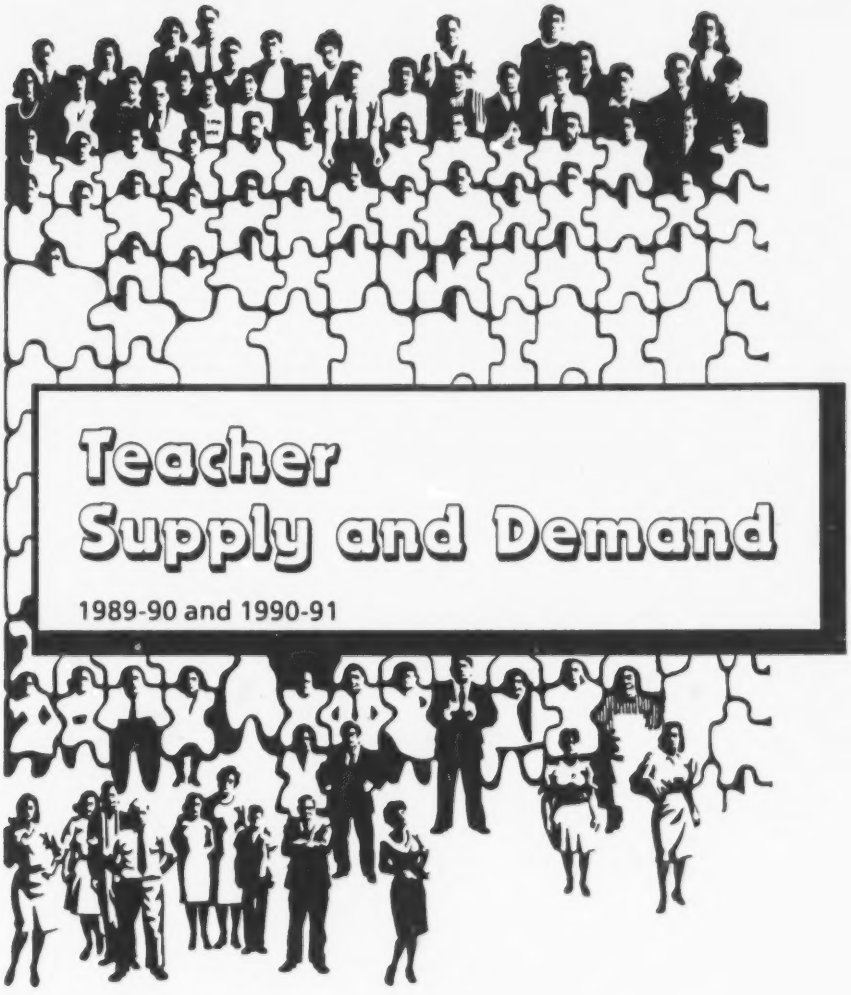

Teacher Supply and Demand

1989-90 and 1990-91

Prepared by
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Pennsylvania Department of Education

February 1992

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August 1992

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SUMMARY

Purpose

Recent increases in public school enrollments and speculation at the national level that teacher shortages exist in specific geographic areas and for specific areas of certification have raised questions about the supply and demand for public classroom teachers. This study was conducted to determine the supply of and the demand for teachers by the public schools in Pennsylvania and to determine if Pennsylvania is experiencing a teacher shortage.

Procedure

For this study, it was assumed that the number of new hires of classroom teachers by the Local Education Agencies (LEAs) in Pennsylvania is a measure of demand. The number of persons who applied for and received an Instructional I certificate from the Pennsylvania Department of Education was assumed to be a measure of supply. Unfortunately, there is no way of determining how many of those that received an Instructional I certificate were actively seeking a teaching position. New hires of classroom teachers were determined from the professional personnel reports submitted by the LEAs to the Division of Data Services, Bureau of Information Systems. Information on the supply of teachers was derived from records of the Bureau of Teacher Certification and Preparation on all persons who applied for and received teaching certificates. The files on persons who received their teaching certificates between September 1988 and August 1989 (1988-89 Control Group) and between September 1989 and August 1990 (1989-90 Control Group) were analysed and compared with the files containing all the classroom teachers employed in public schools.

Results and Conclusions

Based on the information analysed on the supply of and the demand for classroom teachers for the 1989-90 and 1990-91 school year, the following results and conclusions are profferred:

In general, there appeared to be a more than adequate supply of certified teachers to meet the demand for classroom teachers.

There was little or no demand for secondary teachers to fill new positions. The number of secondary teachers hired was lower than the number of secondary teachers who left.

There was a demand for elementary teachers to fill new positions generated by increasing enrollments and to replace teachers who left their positions. However the supply of newly certified elementary teachers was in excess of the demand for elementary teachers.

There were some differences in the demand for teachers by area of certification. These differences were minor and special incentive programs at the state and national level to influence prospective teachers to enter special areas, such as mathematics and the sciences, appear to be unnecessary.

Only one of five newly certified teachers was employed full time in public schools within a year after receiving their certificates. From this, it may be concluded that there was a significant surplus of available teachers.

The results of this study appear to indicate there is no unmet demand for classroom teachers. This study should be replicated in future years to establish whether the trend seen for 1989-90 and 1990-91 is continuing.

Background

Enrollment declines during the 1970s and early 1980s caused LEAs to reduce the number of classroom teachers. This was accomplished to a large extent by initiating policies of 'no hire - no fire'. Most LEAs in Pennsylvania were able to reduce the number of classroom teachers by filling only critical positions. In an effort to help LEAs, the state legislature enacted a series of incentive programs to entice teachers to retire. Related to this, many LEAs offered incentives, such as retirement bonuses, to teachers if they would retire early. The effect of these policies and practices was to reduce the number of classroom teachers from 116,255 in 1975-76 to 101,484 by 1984-85. But, with the slight (but consistant) increase in births since 1976, the number of classroom teachers hired by LEAs in 1985-86 and thereafter has been greater than the number of teachers who permanently left their positions.

Nationally, similar trends have been observed. The slight increase in births since the middle 1970s has evoked the idea of a 'baby boomlet' (Haggstrom, etal, 1988) and the possibility that the '... teacher market appears to be shifting from a state of surplus to one of shortage.' Federal legislation was passed that provided incentive programs for prospective teachers to enter specialties such as mathematics and the sciences and/or to seek positions in certain geographic areas where presumed shortages exist. Following this lead, many states began offering additional incentives to prospective teachers. In 1984, Pennsylvania began its 'Scholars in Education Award Program and Loan Forgiveness Program' which encourages college students to become mathematics and science teachers. Added to this, in 1988, Pennsylvania enacted an 'Urban and Rural Teacher Loan Forgiveness Program' for state residents who graduate from a Pennsylvania college or university and who apply their degree to teaching in urban and rural schools that meet certain population, enrollment, and state aid ratio criteria.

These actions at the national and state level were designed to increase the supply of teachers in specific subject areas and for certain geographic sectors. But a recent survey of the states (Feistritzer) on the supply of and the demand for teachers indicated that there is no teacher shortage now nor in the foreseeable future. In Pennsylvania, there were also indications that the

supply of teachers appeared sufficient to meet the demand for teachers. Two indicators of this were:

1. The number of emergency certificates requested by LEAs for full time teachers was minimal.

2. An increasing number of students in the 'Scholars in Education Award Program and Loan Forgiveness Program' could not find jobs as teachers and their scholarships were reverting to loans.

Added to this, based on projections of births, the minor increases in elementary enrollments since 1985-86 will probably abate before the year 2000 and cause a moderate but continuing decrease in the actual number of teachers. This study was initiated to analyse information available to the Pennsylvania Department of Education to determine the demand for and the supply of teachers in the Commonwealth.

Procedure

For this study, it was assumed that new hiring of classroom teachers is a measure of demand. Data on all professional personnel employed by LEAs is collected annually by the Pennsylvania Department of Education, Division of Data Services. In October of each year, LEAs are asked to update listings of professional staff compiled from their prior year data submissions. If a staff member left a position, the reason for leaving is to be noted. Anyone hired by the LEA is to be added to the listing. In addition to this basic information, LEAs also provide the following on each staff member:

first and last name
social security number
race
sex
birth date
salary
type of position
full or part time employment status
primary, secondary and tertiary area of certification
primary, secondary and tertiary area of certificated assignment
number of years experience as an educator
number of years employed by the LEA
reason for withdrawal

Computer data files on all professional personnel for the 1989-90 and the 1990-91 school year were accessed to determine how many classroom teachers were employed. Teachers are identified by the assignment to one of the following type of positions:

Code	Type of Position
16	Kindergarten Teacher
17	Elementary School Teacher
18	Secondary School Teacher
19	Specialized Teacher, K through 12 or Middle School
20	Special Education Teacher
21	Speech Correctionist
22	Department Head

These positions were chosen because, historically, publications by the Pennsylvania Department of Education have detailed information on professional personnel by these positions. In this way, it was hoped the findings from this study could be related to past publications.

Using type of position as the criterion for selecting an individual record from the professional personnel file, the number of teachers was determined based on the *primary area of certificated assignment*. To make the information useful for both educational policy makers and potential college students, data on teacher supply and demand was aggregated into major fields of certification (approximately 40 fields as opposed to 400 plus individual areas of certification).

There is no information available within the Department of Education on the supply of qualified teachers in Pennsylvania who are actively seeking employment in the public schools. To derive indicators on the scope of the supply, the data files from the Bureau of Teacher Certification and Preparation, Pennsylvania Department of Education were accessed. A major supply of teachers for the 1989-90 school year was assumed to be all those persons who applied for and received Instructional I teaching certificates between September 1988 and August 1989. Persons in this group are designated in this study as the 1988-89 Control Group. Similarly, a major supply of teachers for the 1990-91 school year was assumed to be all those persons who applied for and received Instructional I teaching certificates between September 1989 and August 1990 (1989-90 Control Group). The data files maintained by that Bureau contain:

- first and last name
- social security number
- sex
- ethnic code
- birth date
- address
- institution graduated from
- educational level
- specialty area
- various test scores and rankings

Both the master files on all the professional personnel employed in LEAS and the certification files contain information on persons by social security number. By matching these two files on social security number, it was determined how many persons in each control group were employed by LEAs. This information is displayed in Tables 5 and 6.

Limitations

The professional personnel files prior to 1990-91 are comparable from year to year because the instructions to LEAs for reporting information did not change materially. However, for the 1990-91 school year, procedural changes were made. There was a significant increase in the number of certificated assignments to which professional personnel could be coded and a number of assignment codes were changed and/or renamed. As a result, the number of teachers reported in the category of 'Not Listed Elsewhere' decreased from 710 in 1989-90 to 104 in 1990-91.

In themselves, these changes could be adjusted for because the old and new assignment codes are known. But, in addition to these changes, LEAs were no longer asked to code their staff by type of position (e.g. - 16 Kindergarten Teacher). Instead, LEA staff were assigned a position code, as part of a computer application, using the certificated assignments as the base criteria. In the past, staff could have been and were assigned a position code used for teachers even though their position was primarily supervisory, administrative or related to providing coordinate services. Under the new system, these professional personnel could not be coded as teachers.

The effect of this procedural change is significant. Information included in the publication, *Public Schools: Professional Personnel 1990-91*, indicates that approximately 4,000 persons were shifted from the classification of teacher. From Table 2, it can be seen that teachers who had also been coded as Administrators and Supervisors, Coordinate Services, and as Reading Specialists were all removed from the classification.

Findings

From Table 1 it can be seen that at the end of the 1988-89 school year, 4,892 teachers left their position and 5,547 were hired for the 1989-90 school year. The increase in the number of teachers hired over those that left is in line with enrollment trends between 1988-89 and 1990-91. Secondary enrollments continued to decrease and the number of secondary teachers, in most areas of certification, also decreased slightly. However early childhood and general elementary teachers grew by about 900, reflecting a general increase in elementary enrollments since 1984-85.

Of the 5,547 public school teachers hired in 1989-90, the majority (3,529 or 63.6 percent) were teachers with no prior teaching experience (see Table 3). However only 1,074 of the 3,529 teachers hired with no experience received their teaching certificates between September 1988 and August 1989 (see Table 5). This finding indicates that newly certified teachers are competing for jobs not only with experienced teachers but also with a supply of inexperienced teachers trained in prior years. In fact, only one in five who recently received their teaching certificates found postions in the public schools.

The findings for the 1990-91 school year were similar. Of the 3,610 teachers hired (see Table 2), the majority (2,246 or 62.2 percent) were teachers with no experience (see Table 4) and of that group 870 were persons who received their teaching certificates between September 1989 and August 1990 (see Table 6). Findings for both control groups indicate there is a build-up of inexperienced teachers competing for jobs with each cohort of newly certified teachers. This appears to confirm Feistritzer's conclusion that there is an adequate supply of potential teachers to meet the demand now and in the foreseeable future.

From the data in Tables 1 and 2, it appears there were fewer teachers hired for the 1990-91 school year than the number of openings created by teachers leaving their jobs. From this, it cannot be concluded that the demand for teachers decreased. The procedural changes in the collection of data on em-

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ployed teachers (see Limitations) that affected the reporting on about 4,000 persons make this shift in the teacher demand more apparent then real.

Perhaps the most significant finding of this study is that of the 6,210 who received their teaching certificates between September 1988 and August 1989 only 1,074 (17.3 percent) found full time employment in public schools and, one year later, only 1,411 (22.7 percent) were employed in public schools. This lends further credence to the idea that there is a sizable pool of inexperienced teachers competing for jobs with each cohort of newly certified teachers.

Conclusions

Based on the information analysed on the supply of and the demand for classroom teachers for the 1989-90 and 1990-91 school year, the following results and conclusions are profferred:

In general, there appeared to be a more than adequate supply of certified teachers to meet the demand for classroom teachers.

There was little or no demand for secondary teachers to fill new positions. The number of secondary teachers hired was lower than the number of secondary teachers who left.

There was a demand for elementary teachers to fill new positions generated by increasing enrollments and to replace teachers who left their positions. However the supply of newly certified elementary teachers was in excess of the demand for elementary teachers.

There were some differences in the demand for teachers by area of certification. These differences were minor and special incentive programs at the state and national level to influence prospective teachers to enter special areas, such as mathematics and the sciences, appear to be unnecessary.

Only one of five newly certified teachers was employed full time in public schools within a year after receiving their certificates. From this, it may be concluded that there was a significant surplus of available teachers.

The results of this study appear to indicate there is no unmet demand for classroom teachers. This study should be replicated in future years to establish whether the trend seen for 1989-90 and 1990-91 is continuing.

TABLES

Table 1

1988-89 Teachers, Number Who Left, Teachers Hired in 1989-90 and Total Number of Teachers at the Beginning of 1989-90

	1988-89 Teachers	Teachers Who Left	Remained	Hired in 1989-90	1989-90 Teachers
Adm/Supervisory	1,070	54	1,016	22	1,038
Agriculture	218	20	198	6	204
Art	2,742	132	2,610	112	2,722
Biology	1,691	80	1,611	67	1,678
Business Education	2,518	164	2,354	74	2,428
Chemistry	874	40	834	47	881
Coordinate Services	508	35	473	60	533
Driver Education	408	15	393	3	396
Early Childhood	968	44	924	140	1,064
Earth/Space	673	33	640	38	678
Eng as a 2nd Lang	131	8	123	19	142
English	7,001	336	6,665	203	6,868
French	771	41	730	41	771
General Elementary	35,137	1,339	33,798	2,105	35,903
General Science	2,174	123	2,051	107	2,158
German	363	5	358	12	370
Gifted	637	28	609	27	636
Health/Phys Educ	5,563	203	5,360	212	5,572
Hearing Impaired	313	16	297	9	306
Home Economics	1,858	102	1,756	76	1,832
Industrial Arts	2,339	110	2,229	59	2,288
Mathematics	6,294	287	6,007	229	6,236
Mental/Phys Handicap	10,274	552	9,722	753	10,475
Music	3,827	224	3,603	216	3,819
Not Listed Elsewhere	488	68	420	290	710
Other Handicap	17	0	17	0	17
Other Languages	192	21	171	17	188
Other Science	53	1	52	0	52
Physics	497	28	469	27	496
Reading Specialist	3,760	166	3,594	150	3,744
Social Studies	6,190	275	5,915	143	6,058
Spanish	1,175	79	1,096	75	1,171
Speech/Lang Impair	1,574	67	1,507	70	1,577
Visually Impaired	171	10	161	7	168
Vocational Education	2,001	165	1,836	114	1,950
Vocational Health Oc	119	12	107	6	113
Vocational Tech Educ	171	9	162	11	173
Total	104,760	4,892	99,868	5,547	105,415

Table 2

1989-90 Teachers, Number Who Left, Teachers Hired in 1990-91 and Total Number of Teachers at the Beginning of 1990-91

	1989-90 Teachers	Teachers Who Left	Remained	Hired in 1990-91	1990-91 Teachers
Adm/Supervisory	499	499	0	0	0
Agriculture	214	14	200	6	206
Art	2,972	154	2,818	114	2,932
Biology	1,825	85	1,740	46	1,786
Business Education	2,565	168	2,397	50	2,447
Chemistry	911	31	880	29	909
Coordinate Services	549	549	0	0	0
Driver Education	405	12	393	4	397
Early Childhood	1,238	75	1,163	63	1,226
Earth/Space	693	28	665	21	686
Eng as a 2nd Lang	7	7	0	0	0
English	7,152	376	6,776	159	6,935
French	861	60	801	47	848
General Elementary	37,301	1,580	35,721	1,291	37,012
General Science	2,222	124	2,098	65	2,163
German	407	20	387	16	403
Gifted	764	43	721	24	745
Health/Phys Educ	5,873	256	5,617	181	5,798
Hearing Impaired	357	15	342	13	355
Home Economics	1,980	123	1,857	68	1,925
Industrial Arts	2,371	119	2,252	58	2,310
Mathematics	6,425	263	6,162	176	6,338
Mental/Phys Handicap	10,869	544	10,325	545	10,870
Music	4,121	235	3,886	223	4,109
Not Listed Elsewhere	676	583	93	11	104
Other Handicap	4	4	0	0	0
Other Languages	226	21	205	18	223
Other Science	46	3	43	1	44
Physics	481	16	465	13	478
Reading Specialist	204	204	0	0	0
Social Studies	6,265	293	5,972	130	6,102
Spanish	1,289	71	1,218	66	1,284
Speech/Lang Impair	1,651	76	1,575	57	1,632
Visually Impaired	185	11	174	7	181
Vocational Education	2,182	161	2,021	90	2,111
Vocational Health Oc	141	14	127	7	134
Vocational Tech Educ	236	12	224	11	235
Total	106,167	6,849	99,318	3,610	102,928

Note: There were a number of procedural changes in the collection of data on professional personnel between 1989-90 and 1990-91. For this reason, the information displayed in Tables 1 and 2 are not directly comparable.

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Table 3

Total Full Time Teachers and First Year Teachers: 1989-90

	Total Teachers	1st Yr wth Experience	1st Yr No Experience	Total 1st Yr Teachers
Adm/Supervisory	1,038	7	15	22
Agriculture	204	4	2	6
Art	2,722	48	64	112
Biology	1,678	21	46	67
Business Education	2,428	35	39	74
Chemistry	881	14	33	47
Coordinate Services	533	14	46	60
Driver Education	396	0	3	3
Early Childhood	1,064	14	126	140
Earth/Space	678	20	18	38
Eng as a 2nd Lang	142	13	6	19
English	6,868	95	108	203
French	771	18	23	41
General Elementary	35,903	581	1,524	2,105
General Science	2,158	35	72	107
German	370	4	8	12
Gifted	636	15	12	27
Health/Phys Educ	5,572	77	135	212
Hearing Impaired	306	5	4	9
Home Economics	1,832	50	26	76
Industrial Arts	2,288	28	31	59
Mathematics	6,236	76	153	229
Mental/Phys Handicap	10,475	330	423	753
Music	3,819	103	113	216
Not Listed Elsewhere	710	19	271	290
Other Handicap	17	0	0	0
Other Languages	188	11	6	17
Other Science	52	0	0	0
Physics	496	8	19	27
Reading Specialist	3,744	101	49	150
Social Studies	6,058	60	83	143
Spanish	1,171	31	44	75
Speech/Lang Impair	1,577	37	33	70
Visually Impaired	168	3	4	7
Vocational Education	1,950	34	80	114
Vocational Health Oc	113	3	3	6
Vocational Tech Educ	173	4	7	11
Total	105,415	1,918	3,629	5,547

Table 4

Total Full Time Teachers and First Year Teachers: 1990-91

	Total Teachers	1st Yr wth Experience	1st Yr No Experience	Total 1st Yr Teachers
Adm/Supervisory	0	0	0	0
Agriculture	206	2	4	6
Art	2,932	48	66	114
Biology	1,786	10	36	46
Business Education	2,447	22	28	50
Chemistry	909	11	18	29
Coordinate Services	0	0	0	0
Driver Education	397	2	2	4
Early Childhood	1,226	13	50	63
Earth/Space	686	9	12	21
Eng as a 2nd Lang	0	0	0	0
English	6,935	65	94	159
French	848	22	25	47
General Elementary	37,012	390	901	1,291
General Science	2,163	19	46	65
German	403	10	6	16
Gifted	745	13	11	24
Health/Phys Educ	5,798	58	123	181
Hearing Impaired	355	6	7	13
Home Economics	1,925	45	23	68
Industrial Arts	2,310	28	30	58
Mathematics	6,338	57	119	176
Mental/Phys Handicap	10,870	257	288	545
Music	4,109	116	107	223
Not Listed Elsewhere	104	6	5	11
Other Handicap	0	0	0	0
Other Languages	223	11	7	18
Other Science	44	1	0	1
Physics	478	4	9	13
Reading Specialist	0	0	0	0
Social Studies	6,102	51	79	130
Spanish	1,284	32	34	66
Speech/Lang Impair	1,632	26	31	57
Visually Impaired	181	2	5	7
Vocational Education	2,111	23	67	90
Vocational Health Oc	134	2	5	7
Vocational Tech Educ	235	3	8	11
Total	102,928	1,364	2,246	3,610

Table 5

1988-89 Control Group
Full Time Employment in LEAs by Major Certification Code

	Total in Group	Employed in 89-90	Employed in 90-91	% of Total
Accounting	29	6	6	20.7
Agriculture	4	2	2	50.0
Art	138	20	29	21.0
Biology	242	36	48	19.8
Chemistry	63	12	16	25.4
Data Processing	6	1	1	16.7
Diag/Prescriptive Reading	13	4	5	38.5
Early Childhood	212	23	28	13.2
Earth/Space Science	47	15	15	31.9
Elem School Counselor	1	0	0	
Elementary	2,773	448	600	21.6
English	363	52	69	19.0
Environmental Education	5	0	0	
French	43	4	9	20.9
General English	56	7	15	26.8
German	14	2	3	21.4
Health	12	0	0	
Hearing Impaired	19	1	3	15.8
Home Economics	23	4	4	17.4
Home/School Visitor	1	1	1	100.0
Ind Arts/Technology Ed	57	15	20	35.1
Interm General Science	37	11	12	32.4
K-12 Health/Phys Ed	218	37	46	21.1
K-12 Library Science	31	13	13	41.9
K-12 Music	203	38	54	26.6
Latin	5	0	0	
Market/Distributive Ed	10	0	0	
Marketing	11	1	1	9.1
Mathematics	431	79	101	23.4
Mental/Physical Handicap	447	147	178	39.8
Office Technologies	25	4	5	20.0
Physics	28	7	7	25.0
Physics/Mathematics	9	5	8	88.9
Russian	1	0	0	
School Nurse	1	0	0	
Secretarial	20	4	4	20.0
Social Studies	453	45	67	14.8
Spanish	57	14	19	33.3
Speech/Language Impair	91	14	19	20.9
Visually Impaired	11	2	3	27.3
Total	6,210	1,074	1,411	22.7

Note: There were also 79 employed part time by LEAs in 1990-91 and 106 in 1991-92.

Table 6

1989-90 Control Group
Full Time Employment in LEAs by Major Certification Code

	Total in Group	Employed in 90-91	% of Total
Accounting	45	7	15.6
Agriculture	12	5	41.7
Art	172	13	7.6
Biology	229	26	11.4
Chemistry	62	15	24.2
Comprehensive English	1	0	
Data Processing	12	4	33.3
Diag/Prescriptive Reading	23	4	17.4
Early Childhood	230	15	6.5
Earth/Space Science	51	6	11.8
Elementary	3,438	380	11.1
English	388	39	10.1
Environmental Education	5	1	20.0
French	46	3	6.5
General English	58	5	8.6
German	14	1	7.1
Health	4	0	
Hearing Impaired	17	1	5.9
Home Economics	22	3	13.6
Ind Arts/Technology Ed	62	15	24.2
Ind Arts, General Shop	1	0	
Interm General Science	31	7	22.6
K-12 Health/Phys Ed	226	33	14.6
K-12 Library Science	38	8	21.1
K-12 Music	213	33	15.5
Latin	4	0	
Market/Distributive Ed	5	2	40.0
Marketing	12	0	
Mathematics	440	49	11.1
Mental/Physical Handicap	496	133	26.8
Office Technologies	25	3	12.0
Physics	34	4	11.8
Secretarial	16	1	6.3
Social Studies	461	31	6.7
Spanish	61	11	18.0
Speech/Language Impair	114	10	8.8
Temp Cert - Specialist	1	0	
Visually Impaired	7	2	28.6
Total	7,076	870	12.3

Note: There were also 83 employed part time by LEAs in 1990-91.

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